IN THE CLAIMS

1. (Original) A microdevice for controlling fluid flow, comprising:

a cover plate having a substantially planar contact surface and a plurality of fluid-transporting features associated therewith; and

a substrate having a substantially planar contact surface and a fluid-transporting feature associated therewith,

wherein the contact surfaces are positioned in slidable and fluid-tight contact to allow for controllable formation of a plurality of different flow paths upon alignment of the substrate fluid-transporting feature with each cover plate fluid-transporting feature in succession.

2. (Original) The microdevice of claim 1, wherein the cover plate is arranged over the substrate.

3. (Original) The microdevice of claim 1, wherein the substrate is arranged over the cover plate.

4. (Original) The microdevice of claim 1, wherein at least one cover plate fluid-transporting feature comprises a conduit having a substantially constant cross-sectional area.

5. (Original) The microdevice of claim 1, wherein the substrate fluid-transporting feature comprises a conduit having a substantially constant cross-sectional area.

6. (Original) The microdevice of claim 1, wherein the substrate fluid-transporting feature and at least one cover plate fluid-transporting feature, upon alignment, form a fluid-transporting conduit having a controllable cross-sectional area no greater than about 1 mm^2.

7. (Original) The microdevice of claim 6, wherein the area is no greater than about 0.1 mm^2.

8. (Original) The microdevice of claim 1, wherein the contact surfaces are rotationally slidable with respect to each other.

9. (Withdrawn) The microdevice of claim 1, wherein the contact surfaces are linearly slidable with respect to each other.

10. (Original) The microdevice of claim 1, wherein at least one fluid-transporting feature comprises a channel.

11. (Original) The microdevice of claim 1, wherein at least fluid-transporting feature is in fluid communication with a separation unit.

12. (Original) The microdevice of claim 11, wherein the separation unit is an integral part of the microdevice.

13. (Original) The microdevice of claim 11, wherein the separation unit is detachable from the microdevice.

14. (Original) The microdevice of claim 1, wherein the separation unit is constructed to carry out chromatography.

15. (Original) The microdevice of claim 1, wherein at least fluid-transporting feature is in fluid communication with a mass spectrometer.

16. (Original) The microdevice of claim 1, wherein the substrate, cover plate, or both comprise a biofouling-resistant polymer.

17. (Original) The microdevice of claim 16, wherein the biofouling-resistant polymer is selected from the group consisting of polyimides, polyketone, mixtures thereof, and copolymers thereof.

18. (Original) The microdevice of claim 1, wherein each flow path has a different length.

19. (Original) A microdevice for controlling fluid flow, comprising:

a cover plate having a substantially planar contact surface and a plurality of fluid-transporting features associated therewith; and

a substrate having a substantially planar contact surface and a fluid-transporting feature associated therewith,

wherein the substrate is comprised of a biofouling resistant polymer, and the contact surfaces are positioned in slidable and fluid-tight contact to allow for controllable formation of a plurality of different flow paths upon alignment of the substrate fluid-transporting feature with each cover plate fluid-transporting feature in succession.

20. (Currently Amended) A microdevice for controlling fluid flow, comprising:

a cover plate having a substantially planar contact surface and a plurality of fluid-transporting features associated therewith; and

a substrate having a substantially planar contact surface and a plurality of

fluid-transporting feature associated therewith,

wherein the contact surfaces are positioned in slidable and fluid-tight contact to allow for controllable formation of different flow paths in the microdevice, and further wherein each flow path has a cross-sectional area no greater than about 1 mm^2 and is formed as a result of a different alignment of the fluid-transporting features.